PATENT ABSTRACTS OF JAPAN

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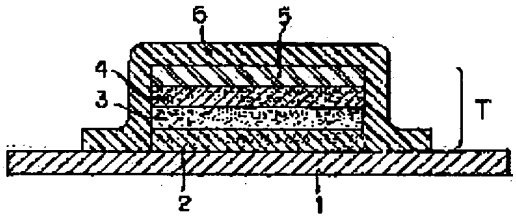
(54) THERMAL TRANSFER SHEET

(57)Abstract:
PURPOSE: To prevent a marked damage of the appearance of a receiving material even when fluorescent pigment is faded and to prevent the fading of the fluorescent pigment in the transfer mark of the receiving material to the utmost.
CONSTITUTION: Pigment having a fluorescent color is mixed with a fluorescent ink layer 4 and pigment having a color substantially same to or similar to a color wherein fluorescent effect is removed from the color of the pigment mixed with the fluorescent in layer 4 is mixed with a false ink layer 3. An ultraviolet absorber can be mixed with a transfer ink layer T.



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[Claim(s)]

[Claim 1] In a heating imprint sheet which has a base material sheet, an imprint ink layer, and a protection film layer in this order said imprint ink layer Base material sheet sides are consisted of by each class currently formed in order of a white ink layer, a fluorescence color maintenance false ink layer, a fluorescence ink layer, and a clear ink layer. In said fluorescence ink layer A heating imprint sheet characterized by mixing a fluorescent pigment and mixing in a fluorescence color maintenance false ink layer a color except the fluorescence effect, and a pigment which is the same color or a same-system color substantially from a color of said fluorescent pigment.

[Claim 2] A heating imprint sheet according to claim 1 with which an ultraviolet ray absorbent is mixed into [of a fluorescence color maintenance false ink layer, a fluorescence ink layer, and the clear ink layers] at least one layer.

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the heating imprint sheet used in order to give a pattern etc. to adherends, such as an automobile and a motorcycle.

[0002]

[Description of the Prior Art] For example, although the pattern of an alphabetic character, an illustration, etc. is given to the automobile, the motorcycle, and the automatic vending machine, as for these patterns, they have many which are depended on the imprint mark by which a heating imprint is conventionally carried out with a heating imprint sheet (henceforth an imprint sheet).

[0003] This imprint sheet is equipped with pasteboard, the imprint ink layer, and the protection film layer, for example, for example, a water-soluble paste layer is formed in the single-sided front face of pasteboard like a JP,4-10073,Y publication, and the imprint ink layer and the protection film layer are formed through this water-soluble paste layer.

[0004] With this imprint sheet, as it is shown below, an imprint mark is imprinted to

adherend. First, the whole imprint sheet is immersed in water or a water solvent, the fritting solution of the water-soluble paste layer is carried out, and pasteboard is exfoliated. Then, an imprint ink layer is stuck to adherend by pressure, it heats at the temperature of about 60 degrees C - 100 degrees C, an imprint ink layer is stiffened, and it becomes an imprint mark, and after that, the protection film layer of the maximum upper layer is exfoliated, and an imprint is completed.

[0005]

[Problem(s) to be Solved by the Invention] By the way, adherends used outdoors, such as an automobile and a motorcycle, are expected to give the pattern of a fluorescence color etc. in recent years. The imprint sheet for the patterns of a fluorescence color is just going to be known conventionally, and the fluorescent pigment is mixed in the imprint ink layer. However, when this imprint mark puts to sunlight after it imprints the imprint mark to which the fluorescent pigment was mixed in the adherend used outdoors since this fluorescent pigment has the property which tends to be decomposed by ultraviolet rays, and the fluorescent pigment under imprint mark exposed to ultraviolet rays decomposes, the fluorescence color of an imprint mark fades remarkably and the problem that where of the appearance of an adherend is spoiled remarkably is in it.

[0006] Then, even if the technical problem of this invention is the case where the fluorescent pigment under imprint mark fades, making it an unclear imprint mark has the fading.

[0007]

[Means for Solving the Problem] In a heating imprint sheet with which this invention has a base material sheet, an imprint ink layer, and a protection film layer in this order in order to solve the above-mentioned technical problem said imprint ink layer Base material sheet sides are consisted of by each class currently formed in order of a white ink layer, a fluorescence color maintenance false ink layer, a fluorescence ink layer, and a clear ink layer. In said fluorescence ink layer A fluorescent pigment is mixed and a point that a color except the fluorescence effect and a pigment which is the same color or a same-system color substantially are mixed is considered as the configuration from a color of said fluorescent pigment at a fluorescence color maintenance false ink layer. Moreover, an ultraviolet ray absorbent is preferably mixed into [of a fluorescence color maintenance false ink layer, a fluorescence ink layer, and the clear ink layers] at least one layer.

[0008]

[Function] In the imprint sheet concerning this invention, the fluorescence color

maintenance false ink layer (henceforth a false ink layer) is formed between the white ink layer and the fluorescence ink layer. The pigment of the same color or a same-system color is substantially mixed in this false ink layer with the color excluding the fluorescence effect from the color of the fluorescent pigment currently mixed in the fluorescence ink layer.

[0009] Although the fluorescent pigment currently mixed in the fluorescence ink layer fades easily by being put outdoors to sunlight, such an inclination is not seen for the color pigment currently mixed in the false ink layer. For this reason, even if the fluorescent pigment in a fluorescence ink layer fading advances, the color of a false ink layer appears in the portion into which that fading advanced. Therefore, when an imprint mark is given to the adherend used outdoors, even if the fluorescent pigment in a fluorescence ink layer fades, the fading cannot be conspicuous and appearance can be maintained in the beautiful condition.

[0010] Moreover, if an ultraviolet ray absorbent is mixed in an imprint ink layer, since an ultraviolet ray absorbent will absorb ultraviolet rays, the amount of the ultraviolet rays which reach even a fluorescent pigment decreases remarkably, decomposition of the part and a fluorescent pigment is prevented, and it can prevent fading [of a fluorescence color].

[0011]

[Example] Next, the concrete example of a configuration of this invention is explained. The imprint sheet concerning this invention has the lamination shown in drawing 1 . That is, an imprint sheet is formed by carrying out the laminating of the base material sheet 1, the white ink layer 2, the false ink layer 3, the fluorescence ink layer 4, the clear ink layer 5, and the protection film layer 6 in this order. The layer 2 imprinted by adherend, i.e., a white ink layer, the false ink layer 3, the fluorescence ink layer 4, and the clear ink layer 5 constitute an imprint mark as imprint ink layers T after an imprint among these.

[0012] Here, as a base material sheet 1, the thing in which the white ink layer 2 and exfoliation are possible is used, and, specifically, plastic sheets, such as detachability pasteboard which carried out the coat of the removers, such as silicone, to one side or paper which has a water-soluble paste layer, and polyethylene with which itself has detachability, etc. can be illustrated.

[0013] Moreover, as a vehicle in the white ink layer 2, the false ink layer 3, the fluorescence ink layer 4, and the clear ink layer 5, what mixed two of a kind of the thermosetting resin, such as melamine resin besides thermoplastics, such as an epoxy resin, an alkyd resin, a tackifier, saturated polyester resin, urethane resin, acrylic resin,

and salt vinyl acetate resin, and block isocyanate, or sorts or more of they, for example can be used. In order to heat-harden at low temperature comparatively, it is desirable to use a melamine resin system and it is [among these] desirable to use especially the melamine system resin which blended polyester system resin and an alkyd resin with melamine resin, and mainly gave spread nature etc. to melamine resin.

[0014] Moreover, it is desirable to use the thing which comes to carry out 20-200 weight section combination of either [at least] molecular weight 500-4000, the low-molecular epoxy resin of 50-100 degrees C of softening temperatures or a tackifier among these vehicles to the with a molecular weight of 10000 or more macromolecule epoxy resin 100 weight section. When using together both low-molecular epoxy and tackifier, it is good to make a low-molecular epoxy resin into the 20 - 100 weight section, and to make a tackifier into the 20 - 100 weight section to the macromolecule epoxy resin 100 weight section. If such a vehicle is used, the imprint mark in which the installation force to the adherend which there is little aging, and is excellent in weatherability, and has a curved surface is excellent will be obtained. In addition, all "molecular weight" here says "number average molecular weight."

[0015] Here, as a tackifier, terpene resin, terpene phenol resin, phenol resin, rosin resin, cumarone indene resin, aliphatic series (C-5) petroleum resin, aromatic series (C-9) petroleum resin, aliphatic series aromatic series mixing (C-5 / C-9) petroleum resin, ketone resin, these hydrogenation resin, etc. can be illustrated. Also in this, terpene phenol resin, phenol resin, rosin resin, cumarone indene resin, aromatic series (C-9) petroleum resin, aliphatic series aromatic series mixing (C-5 / C-9) petroleum resin, ketone resin, especially these hydrogenation resin, etc. are suitable, and further especially polar high phenol resin, cumarone indene resin, aromatic series (C-9) petroleum resin, aliphatic series aromatic series mixing (C-5 / C-9) petroleum resin, and ketone resin are the optimal.

[0016] On the other hand, as a pigment mixed in the imprint ink layer T 3, i.e., a false ink layer, or the fluorescence ink layer 4, inorganic [, such as titanium oxide, carbon black, an azo system, a phthalocyanine system, and a dioxazine system,] and an organic acid can be illustrated. Moreover, the fluorescent pigment of these is mixed in the fluorescence ink layer 4. And the pigment of the same color or a same-system color is substantially mixed in the false ink layer 3 with the color excluding the fluorescence effect from this fluorescent pigment. It is not necessary to mix a white pigment in the white ink layer 2, and transparence or a translucent pigment does not need to mix in the clear ink layer 5, or it is not necessary to mix a pigment.

[0017] Moreover, it is the object which protects the imprint ink layer T after an imprint,

and it is also possible to cover with transparence or a translucent overcoat layer (not shown) after the completion of an imprint. As a formation material of this overcoat layer, coatings, such as urethane resin, acrylic resin, an epoxy resin, and a fluororesin, can be used.

[0018] In forming an overcoat layer, in order to raise adhesion with this overcoat layer, as a material which forms the clear ink layer 5, what mixed nature pigments of the transparent body, such as a particle silica and a barium sulfate, in the vehicle is suitable. On the other hand, in not forming an overcoat layer, in order to raise detachability with the protection film layer 6, the vehicle which carried out little addition of the well-known additives for printing, such as a defoaming agent and a leveling agent, can be used suitably.

[0019] Moreover, it is effective in the false ink layer 3, the fluorescence ink layer 4, and/or a clear ink layer to add an ultraviolet ray absorbent, and the ultraviolet ray absorbent of inorganic systems, such as organic systems, such as a benzophenone system, a benzotriazol system, a SARISHI rate system, and phenyl acrylate, and an iron oxide, is effective as this ultraviolet ray absorbent. Furthermore, it is effective to also add the stabilizer.

[0020] As a protection film layer 6, what mixed ester system plasticizers, such as a glycol and phthalic ester, and adipate, or the plasticizer of a polyester system can be used for vinyl chloride resin or acrylic resin, for example.

[0021] Each ink layer and the protection film layer 6 in these imprint ink layers T can be formed by screen-stencil. That is, these stratification materials can be obtained by carrying out sequential screen-stencil on the base material sheet 1. Preferably, although the protection film layer 6 covers the whole also including the end face of the imprint ink layer T, in the case of a single pattern etc., it can be made into the shape of the imprint ink layer T and isomorphism, and can also cover only the outside surface.

[0022] In addition, although a false ink layer can be omitted, the pigment of the same color or a same-system color can be made substantially intermingled in a fluorescence ink layer with the color excluding the fluorescence effect from the color of a fluorescent pigment and this fluorescent pigment and an ultraviolet ray absorbent, a stabilizer, etc. can also be mixed in this fluorescence ink layer to make thickness of the imprint ink layer T thin, as compared with this invention, the degree of discoloration becomes large.

[0023] On the occasion of the activity of the heating imprint sheet obtained in this way, the base material sheet 1 is removed first, and to adherend, the imprint ink layer T is stuck by pressure, and is familiarized using a squeegee etc. Subsequently, it heats in a proper temperature of 60-100 degrees C (in the case of a heat-curing mold, it is 80-120

degrees C), for example, temperature, and adherend is pasted. If radiationnal cooling is completed, the protection film layer 6 will be removed, it will leave the imprint ink layer T, and an imprint will be completed.

[0024] An example is shown below a <example> and the effect of this invention is clarified further.

[0025] (Example 1) In this example, the thing of a macromolecule epoxy resin (trade name; Epicoat CL-52-BH35, oil-ized shell epoxy company make) / low-molecular epoxy resin (trade name; Epicoat 1001, oil-ized shell epoxy company make) =100 weight section / 100 weight section was created as a vehicle.

[0026] White ink was screen-stenciled on the base material sheet, the white ink layer was formed, on it, false ink was printed in the same configuration and the false ink layer was formed. Fluorescence ink was printed in the same configuration on it, the fluorescence ink layer was formed, further, on it, clear ink was printed in the same configuration and the clear ink layer was formed. The protection film layer was printed so that a clear ink layer might moreover be covered thoroughly. White ink and false ink, fluorescence ink, and clear ink were formed with the respectively following materials.

White ink: It mixed and created at a rate of a vehicle / titanium white =100 weight section / 100 weight section.

False ink: It mixed and created at a rate of a vehicle / the SHIMURA first yellow RF(trade name, Dainippon Ink make) =100 weight section / 15 weight sections.

Fluorescence ink: A vehicle / FA-46 It mixed and created at a rate of the Orange yellow (a trade name, product made from SHINROIHI) / 100 weight sections / 50 weight sections.

clear -- it mixed and created at a rate of an ink:vehicle / particle silica =100 weight section / 10 weight section.

[0027] Moreover, in false ink, fluorescence ink, and clear ink, the ultraviolet ray absorbent 2 and the 4-hydroxy benzophenone (trade name; C soap **100, SHIPRO KASEI KAISHA, LTD. make) were mixed every 5% each, respectively.

[0028] Viewing estimated fading, after it imprints to an adherend the imprint sheet created as mentioned above and it carries out a weather ring after that for 500 hours.

[0029] As a vehicle, an alkyd resin (trade name; BEKKOZORU EZ-3020-60, Dainippon Ink make) / melamine resin (trade name; super BEKKAMIN L-110-60, ****** ink company make) =100 weight section / 30 weight sections are used. (Example 2) As an ultraviolet ray absorbent, the 2-hydroxy-4-n-dodecyl benzophenone (trade name; C soap **103, SHIPRO KASEI KAISHA, LTD. make) was used, and other conditions of having replaced false ink and fluorescence ink with as follows, respectively performed the same

trial as an example 1. In addition, the ink layer in this example is a thermosetting property.

[0030] False ink: It mixed and created at a rate of a vehicle / the SHIMURA first yellow 4186(trade name, Dainippon Ink make) =100 weight section / 15 weight sections.

[0031] Fluorescence ink: A vehicle / the FA-45J(trade name, product made from SHINROIHI) =100 weight section / 60 weight sections was mixed and created.

[0032] (Example 1 of a comparison) Other conditions of having not mixed an ultraviolet ray absorbent and not preparing a false ink layer examined as the same as an example 1.

[0033] (Example 2 of a comparison) Other conditions of having not mixed an ultraviolet ray absorbent and not preparing a false ink layer examined as the same as an example 2.

[0034] As mentioned above, the test result of examples 1 and 2 and the examples 1 and 2 of a comparison is shown in a table 1.

[0035]

[A table 1]

	退　　色
実施例 1	○
実施例 2	○
比較例 1	×
比較例 2	×

評価　　○：わずかに変色した

×：蛍光色が消え、白色化した

[0036] Even if it is the case where the fluorescence color in a fluorescence ink layer fades according to this invention so that clearly from a table 1, it turns out that the beautiful feeling by visual assessment is not spoiled.

[0037]

[Effect of the Invention] According to this invention the above passage, even if it is the

case where the fluorescent pigment under imprint mark fades, appearance of an adherend is not spoiled remarkably. Moreover, even if it is the case where it imprints to the adherend used outdoors, it can control that a fluorescent pigment fades.

[Brief Description of the Drawings]

[Drawing 1] It is the outline cross section of the basic lamination of the imprint sheet concerning this invention.

[Description of Notations]

1 [-- A fluorescence ink layer, 5 / -- A clear ink layer, 6 / -- A protection film layer, T / -- Imprint ink layer.] -- A base material sheet, 2 -- A white ink layer, 3 -- A fluorescence color maintenance false ink layer, 4

[Drawing 1]